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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/706,477	11/07/2003	Randall Gemmen	S-100,791	7939

31970            7590            05/31/2005

UNITED STATES DEPARTMENT OF ENERGY  
1000 INDEPENDENCE AVENUE, S.W.  
ATTN: GC-62 (CHI), MS 6F-067  
WASHINGTON, DC 20585-0162

EXAMINER
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BASTIANELLI, JOHN

ART UNIT	PAPER NUMBER
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3751

DATE MAILED: 05/31/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/706,477	GEMMEN ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	John Bastianelli	3751	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 30 March 2004.
- 2a) This action is FINAL.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) 16 and 19-26 is/are allowed.
- 6) Claim(s) 1-8, 10-15, 17 and 18 is/are rejected.
- 7) Claim(s) 9 is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 30 March 2004 is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) All
  - b) Some \*
  - c) None of:
    1. Certified copies of the priority documents have been received.
    2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                    | Paper No(s)/Mail Date. _____.   |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____. | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
|   | 6) <input type="checkbox"/> Other: _____.                                   |

## **DETAILED ACTION**

### *Drawings*

1. Figures 3e and 3f as cited in the specification are not in the drawings.
2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the second piezoelectric portion having an intermediate layer and stackable valves must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Specification***

3. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

4. The abstract of the disclosure is objected to because it is too long and has little to do with the subject as claimed. Correction is required. See MPEP § 608.01(b).

5. The disclosure is objected to because of the following informalities: The brief description of the drawings is inconsistent with the drawings. Fig. 3a is missing in the brief description and there is not a Fig. 3 in the drawings. Figs. 3e and 3f are not in the drawings at all. Appropriate correction is required.

6. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

***Claim Objections***

7. Claims 7 and 22 are objected to because of the following informalities: Claim 7 and 22 claim the same thing that claim 6 and 21 already claim that "the deflectable member includes a fixed end and free end". Also in claim 7, "the chamber? (cavity)" does not make sense. Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

8. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

9. Claims 2-4 and 17-18 are rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling. A second piezoelectric portion with an intermediate layer is critical or essential to the practice of the invention, but not included in the claim(s) is not enabled by the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976). This is not included in the disclosure.

10. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

11. Claims 2-4 and 17-18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The second piezoelectric portion with an intermediate layer is not disclosed in the drawings or specification. These claims are unsearchable.

***Claim Rejections - 35 USC § 102***

12. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

13. Claims 1-8 and 13-15, as understood, are rejected under 35 U.S.C. 102(b) as being anticipated by Lee, II et al. US 4,492,360.

Lee discloses a piezoelectrically actuated microvalve operable to affect the flow of a fluid upon application of a voltage from a voltage source, the microvalve comprising, a valve body 12, 14, and (plug in 18) having a first end and a second end, the valve body including an elongated flow channel (Fig. 1) formed therein and extending substantially longitudinally between the first and second ends to permit substantially longitudinal flow of the fluid therethrough and between the first and second ends; and a deflectable member 38 disposed on the valve body, the deflectable member including at least a first piezoelectric portion 42 that is piezoelectrically operable to deflect the deflectable member between an open position and a closed position upon the application of a voltage, the deflectable member in the closed position being operable to resist the flow of the fluid through the flow channel. The deflectable member has a second piezoelectric portion 42 with an intermediate member 40 made of brass. The valve body has a cavity (Fig. 1) with a portion of the deflectable member in the cavity. The deflectable member has a fixed end (left 38) secured to the valve body and free end (right 38) and a gate 56 receivable in the flow channel to resist fluid flow. The valve body includes a first wafer 14, a second wafer 12 and a third wafer (plug in 18) with the cavity between the first and second wafers and the flow channel between the second and third wafers. The second wafer has a opening 58. The deflectable member is deflectable in a substantially linear manner. The first and second end as well as the fixed and free end are opposite one another.

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14. Alternatively, claims 1, 5-6, and 13-15 are rejected under 35 U.S.C. 102(b) as being anticipated by Frisch et al. US 6,173,744.

Frisch discloses a piezoelectrically actuated microvalve operable to affect the flow of a fluid upon application of a voltage from a voltage source, the microvalve comprising, a valve body 1 and 6 having a first end and a second end, the valve body including an elongated flow channel 2 formed therein and extending substantially longitudinally between the first and second ends to permit substantially longitudinal flow of the fluid therethrough and between the first and second ends; and a deflectable member 7 disposed on the valve body, the deflectable member including at least a first piezoelectric portion that is piezoelectrically operable to deflect the deflectable member between an open position and a closed position upon the application of a voltage, the deflectable member in the closed position being operable to resist the flow of the fluid through the flow channel. The valve body has a cavity 2 with a portion of the deflectable member in the cavity. The deflectable member has a fixed end (left 7) secured to the valve body and free end (right 7) and a gate (valved end of 7) receivable in the flow channel to resist fluid flow. The deflectable member is deflectable in a substantially linear manner. The first and second end as well as the fixed and free end are opposite one another.

*Claim Rejections - 35 USC § 103*

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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16. Claims 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Frisch et al. US 6,173,744.

Frisch discloses wafers 1 and 6. Frisch lacks the wafer 1 being as two wafers. It would have been obvious to one having ordinary skill in the art at the time the invention was made to make the integral wafer 1 of Frisch into separable upper and lower wafers, since it has been held that constructing a formerly integral structure in various elements involves only routine skill in the art. *Nerwin v. Erlichmann*, 168 USPQ 177 (Bd PatApp&Int 1969) as this would provide easier access to the valve. Therefore the valve body includes a first wafer (upper 1), a second wafer (6) and a third wafer (lower 1) with the cavity between the first and second wafers and the flow channel between the second and third wafers.

17. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lee, II et al. US 4,492,360 in view of Gattuso et al. 6,086,041.

Lee lacks a mention of the valves being stackable. Gattuso discloses stackable valves. It would have been obvious to one having ordinary skill in the art at the time the invention was made to stack the valves of Lee as disclosed by Gattuso in order to provide more passages and flow that can be valved in a smaller area.

18. Alternatively, claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Frisch et al. US 6,173,744 in view of Gattuso et al. 6,086,041.

Frisch lacks a mention of the valves being stackable. Gattuso discloses stackable valves. It would have been obvious to one having ordinary skill in the art at the time the invention was made to stack the valves of Frisch as disclosed by Gattuso in order to provide more passages and flow that can be valved in a smaller area.

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19. Claims 11-12 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Lee, II et al. US 4,492,360.

Lee lacks a mention of the valve used in a low voltage application and resists degradation by hydrogen gas. The application used in Lee is seen to be low voltage and the microvalve is seen to resist degradation by hydrogen gas. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the valve in low voltage applications in order to have a safer environment so that fires are not started. It would have been obvious to one having ordinary skill in the art at the time the invention was made to make the covering of Lee resist degradation by all gases in order to prolong the life of the valve.

20. Alternatively, claims 11-12 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Frisch et al. US 6,173,744.

Frisch lacks a mention of the valve used in a low voltage application and resists degradation by hydrogen gas. The application used in Frisch is seen to be low voltage and the microvalve has a covering 10 that is seen to resist degradation by hydrogen gas. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the valve in low voltage applications in order to have a safer environment so that fires are not started. It would have been obvious to one having ordinary skill in the art at the time the invention was made to make the covering of Frisch resist degradation by all gases in order to prolong the life of the valve.

***Allowable Subject Matter***

21. Claims 16 and 19-26 are allowed.

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22. Claims 17-18 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

23. Claim 9 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

24. The following is a statement of reasons for the indication of allowable subject matter in claim 9: The primary reason for the allowance of the claims is the second wafer having a port wherein the port provides fluid communication between the flow channel and the chamber in combination with the device as cited in claims 8/7/6/5/1.

25. The following is an examiner's statement of reasons for allowance of claims 16-26: The primary reason for the allowance of the claims is the combination of a fuel cell body with a labyrinth system, a catalyst and a microvalve with the valve body having first and second ends with a longitudinal flow channel between the ends in which the piezoelectric deflectable member opens and closes the valve.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

***Conclusion***

26. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Eberhardt, Brown, Frisch, Dugan and Bouchard disclose valve bodies with deflectable piezoelectric members. Dugas also discloses brass. Hockaday, Pedicini, Kobayashi, Gyoten, and Dai disclose piezoelectric valves in fuel cells.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John Bastianelli whose telephone number is (571) 272-4921. The examiner can normally be reached on M-F (9:00-6:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Justine Yu can be reached on (571) 272-4835. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



John Bastianelli  
Primary Examiner  
Art Unit 3751



JB

May 26, 2005